

**Phosphate treatment, carried out before painting - comprises cold-electrolysis in zinc phosphate conversion treating soln. contg. ferric ions**

**Patent Number : JP01021095**

*International patents classification : C25D-011/36*

**• Abstract :**

JP1021095 A Phosphating is carried out by cold-electrolysing cleaned metal in a Zn-phosphate conversion treating soln. contg. 0.5-1.5 g/l Zn, PO<sub>4</sub> ions with 5-50 : 1 of PO<sub>4</sub>: Zn (g/l), and at least 5 ppm Fe(3+) at pH of 3-4.5.

Pref. treatment with Ti system surface conditioning aq. soln. is carried out before conversion treatment. The temp. of the conversion treatment is pref. 30-10 deg.C.

USE/ADVANTAGE - Used for pretreatment for paint coating. Improved adherence between metal and conversion coating, and improved corrosion resistance of the coating can be obtd..

In an example, cold rolled steel sheet was phosphate-treated by degreasing and rinsing, then treating in aq. soln. of surface conditioning agent at 20-25 deg.C for 30 dec. by spraying, and conversion treating in soln. contg. 0.8g/l Zn, 15g g/l NO<sub>2</sub>PO<sub>4</sub>, 20 ppm Fe(3+) 6.7 g/l NO<sub>3</sub>, 0.1 g/l, 0.6 g/l Ni, and 0.1 g/l boron-fluoride ion, at 3.8 pH and 25 deg.C, 0.5 A/dm<sup>2</sup> c-d, AC for 60 sec. electrolysis time, and dipping it for 60 sec. The steel sheet obtd. had dense and uniform phosphate coating. The phosphated steel sheet was then electrocoated with cationic paint by applying 180 V for 3 min, and baked at 180 deg.C for 30 min. after rinsing. The electrocoated steel sheet exhibited good corrosion resistance after 1000 hrs. sat fog testing.

**• Publication data :**

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**• Patentee & Inventor(s) :**

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**• Derwent codes :**

Manual code : CPI: M11-F

Derwent Classes : M14

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## High speed forming of lubricating zinc phosphate coating on surface - of iron or steel providing excellent adherence and uniform, fine, dense structure

Patent Number : WO9119836

International patents classification : C25D-009/08 C25D-011/36

• **Abstract :**

WO9119836 A A method for forming a zinc phosphate-contg. conversion coating on the surface of a workpiece selected from iron, carbon steel and low alloy steels is described. The workpiece, typically, e.g. a carbon steel wire rod, is subjected to cathodic electrolysis in an acidic electrolysis bath whose essential components are H<sub>2</sub>O, free acid, 3-20 (pref. 5-10)g per l Zn<sup>2+</sup>, 3-20 (pref. 5-10)g per l PO<sub>4</sub><sup>3-</sup> and 3-40 (pref. 5-20)g per l NO<sub>3</sub><sup>-</sup> ions. The wt. ratio of Zn<sup>2+</sup>:PO<sub>4</sub><sup>3-</sup> ions is 0.7-1.4 and of NO<sub>3</sub><sup>-</sup>:PO<sub>4</sub><sup>3-</sup> is 0.7-2.6. The bath also opt. contains cations of heavy metals other than Zn (e.g. Ni, Mn, Mg, Ca, etc.), but no substantial amts. of complexing agents for Zn<sup>2+</sup> ions.

Pref. the bath is maintained at a temp. of 20-90 deg.C. whilst in contact with the workpiece. The cathodic current density is 2-20 (pref. 5-10) A per dm<sup>2</sup>, and the time of electrolysis (pref. 1-30 secs.) is chosen to produce a coating wt. of 3-20g per m<sup>2</sup>.

USE/ADVANTAGE - As a lubricant treatment for the drawing of carbon steel wire rod, etc., prior to drawing or other cold working operations. The treatment is applied in-line at high speeds, to form a highly adherent, uniform, dense and fine phosphate film. There is no deposition of metallic Zn on the surface of the workpiece. (13pp Dwg.No.0/0)

• **Publication data :**

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CA US DSRW: AT BE CH DE DK ES FR GB GR IT LU NL SE

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Cited patents : DE-746271; EP-288853

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• **Accession codes :**

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## Zinc metal steel surfaces phosphate coating - using soln. for rapid deposition rate of nickel and/or cobalt avoiding increased amts. of metals in starting phosphating soln.

Patent Number : DE4111186

International patents classification : C25D-011/36

• **Abstract :**

DE4111186 A Coating involves using an acidic aq. soln. contg. in g/l: 0.1-5 Zn<sup>2+</sup> cations; 5-50 PO<sub>4</sub><sup>3-</sup> anions; 0.1-50 NO<sub>3</sub><sup>-</sup> anions; 0.1-5 Ni<sup>2+</sup> cations and/or 0.1-5 Co<sup>2+</sup> cations. The soln. has a pH of 1.5-4.5 at 10-80 deg.C and treated for 1-300 s with the workpiece cathodically connected in a circuit using a DC of density 0.01-100 mA/c. Pref. compsn. of the soln. is 0.5-2 Zn<sup>2+</sup>; 10-20 PO<sub>4</sub><sup>3+</sup>; 1-30 NO<sub>3</sub><sup>-</sup>; 0.5-2 Ni<sup>2+</sup>; 0.5-2 Co<sup>2+</sup> and the pref. conditions are 2-3 pH; 40-70 deg.C, 2-10 sec. treatment time and 1-50 mA/cm<sup>2</sup> current density. The soln. may also contain 0.1-5, (0.5-2) g/l Mn<sup>2+</sup> or 0.01-2 (0.1-1) Mg<sup>2+</sup> together with 0.1-50 (0.2-2) g/l simple or complex fluoride anions. Prior to phosphating, the workpiece is activated in a Ti-contg. activation soln.

USE/ADVANTAGE - Avoids increase of concn. of expensive metals in the phosphating sol (Dwg.0/0)

EP-578670 B A process for phosphating metal surfaces, preferably electrolytically galvanised or hot-dip-galvanised steel strip surfaces, by the dip or spray-dip treatment thereof with acidic aqueous solutions: a) the phosphating solutions used in addition to zinc ions, also containing ions of at least one other divalent metal and the following components: PO<sub>4</sub><sup>3-</sup> anions in a quantity of 5 to 50 g/l, NO<sub>3</sub><sup>-</sup> anions in a quantity of 0.1 to 50 g/l, b) the following conditions being maintained: pH value of the phosphating solutions in the range from 1.5 to 4.5, temperature of the phosphating solutions in the range from 10 to 80 deg.C, treatment time in the range from 1 to 300 seconds, c) and the workpieces being cathodically treated during phosphating with a direct current having a density in the range from 0.01 to 100 mA/cm<sup>2</sup>, characterised in that the phosphating solutions contain Zn<sup>2+</sup> cations in a quantity of 0.1 to 5 g/l, Ni<sup>2+</sup> cations in a quantity of 0.1 to 5 g/l and/or Co<sup>2+</sup> cations in a quantity of 0.1 to 5 g/l. ((Dwg.0/0))

US5401381 A Metal surfaces selected from the gp. of Fe, steel, Zn, Zn alloy, Al, and Al alloy are phosphated by dip or spray-dip treatment using acidic aqueous solns. contg. 0.1-5 g/l, Zn<sup>2+</sup> cations, 5-50 g/l, PO<sub>4</sub><sup>3-</sup> anions, 0.1-50 g/l NO<sub>3</sub><sup>-</sup> anions, 0.1-5 g/l Ni<sup>2+</sup> cations, and/or 0.1-5 g/l Co<sup>2+</sup> cations.

Solns. have pH of 1.5-4.5, temp. of 10-80 deg. C., and remain in contact with surfaces for 1-300 seconds. Surfaces are cathodically treated at 0.01-100 mA/cm<sup>2</sup> during phosphating.

ADVANTAGE - Increases incorporation of Ni and/or Co while using low concns. in soln. ((Dwg.0/0))

• **Publication data :**

Patent Family : DE4111186 A 19921008 DW1992-42 C25D-011/36 7p \* AP: 1991DE-4111186 19910406  
WO9217628 A1 19921015 DW1992-44 C25D-011/36 Ger 25p  
AP: 1992WO-EP00703 19920330 DSNW: JP US DSRW: AT BE CH DE DK ES FR GB GR IT LU MC NL SE  
EP-578670 A1 19940119 DW1994-03 C25D-011/36 Ger FD:  
Based on WO9217628 AP: 1992EP-0907188 19920330; 1992WO-EP00703 19920330 DSR: BE DE

**JP06506263** W 19940714 DW1994-32 C25D-

011/36 6p FD: Based on WO9217628 AP: 1992JP-0506849  
19920330; 1992WO-EP00703 19920330  
US5401381 A 19950328 DW1995-18 C25D-011/36 6p FD:  
Based on WO9217628 AP: 1992WO-EP00703 19920330; 1993US-0129163 19931006  
EP-578670 B1 19960515 DW1996-24 C25D-011/36 Eng 11p FD:  
Based on WO9217628 AP: 1992EP-0907188 19920330; 1992WO-EP00703 19920330 DSR: BE DE  
DE59206321 G 19960620 DW1996-30 C25D-011/36 FD: Based  
on EP-578670; Based on WO9217628 AP: 1992DE-5006321  
19920330; 1992EP-0907188 19920330; 1992WO-EP00703  
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